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ETHNICITY, IMMIGRATION, AND WEALTH FLUCTUATIONS IN THE UNITED STATES

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Wealth in the United States rose and fell precipitously during the first decade of this century for all major ethnic groups, but the fluctuations in Hispanic wealth were especially extreme. We show that household characteristics and location can account for the Hispanic experience during the boom but not the bust. We argue that the sudden collapse in credit availability to undocumented immigrants at the start of the recession led, through a contraction in demand for the homes of natural sellers in this market, to a loss in wealth far greater than could be predicted based on household characteristics and location alone.

JEL Codes: D31, E21, J15

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1. Introduction

For all major identity groups in the United States (U.S.), net wealth rose between 1999 and 2007, and for all groups except Asians, it fell precipitously between 2007 and 2011. But the fluctuations in Hispanic wealth were far more extreme than those experienced by any other group. African Americans and Hispanics had largely overlapping wealth distributions in 1999, and then again in 2011, but at the height of the housing boom in 2007, Hispanic median

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wealth had risen threefold while the black wealth distribution was largely unchanged.[1]

This paper is concerned with the mechanisms that gave rise to this exceptional increase and rapid reversal of Hispanic wealth relative to that of other groups. The story is important for several reasons. Obviously, this episode is important for the history of Hispanics in the U.S.; they are the largest minority group in the country, and more Hispanics live in the U.S. than in any other nation except Mexico. Moreover, the national boom-and-bust cycle cannot be understood well without explaining the Hispanic cycle, which far exceeded the national cycle in amplitude.

There are broader issues, too. The growth of the Hispanic population in the U.S. has been spectacular; between 1980 and 2014, the U.S. added more Hispanics than lived in Spain in the early 1990s. It is inevitable that an influx of this magnitude, needing to be housed and seeking to accumulate wealth, will have wide-ranging and significant impacts on local economies. These effects are further complicated by the fact that a considerable fraction of the incoming group do not have full legal rights.

Our focus in this paper is on wealth. We try to understand why Hispanic wealth rose faster than wealth for all other large groups in the boom, and why it fell faster in the bust. Not surprisingly, our analysis leads us to the housing market, although the housing market is not the entire story.

In the boom, the greater growth of Hispanic wealth is relatively easy to explain: Hispanics lived in metropolitan areas where house prices were rising more quickly. For households that were in the PSID in both 1999 and 2007, adding an index of metropolitan house price appreciation to a standard regression for the change in household wealth over that period eliminates any significant ethnic or racial effects. In this paper, we do not try to explain why Hispanics were concentrated in metropolitan areas with greater house price appreciation. Their entry may have caused the appreciation, as suggested by Saiz (2011), for instance; they may have anticipated or followed the appreciation; or the correlation may just be a coincidence. But the fact remains that conditional on metropolitan area house price appreciation, Hispanics did neither appreciably better nor worse than others.

It is much harder to explain why Hispanics lost more wealth in the bust than other groups. The simple explanation—metropolitan area location—that accounts for the boom fails to account for the bust. Even controlling for income, employment, and Metropolitan Statistical Area (MSA)–specific house price changes cannot drive the Hispanic coefficient to insignificance in wealth-change equations. We consider many different popular explanations for this greater loss—leverage, segregation, and other neighborhood effects, and the timing of purchases—but they are inadequate. This leads us to consider the special role of immigration status within the Hispanic population.

[1]These patterns, based on data from the Panel Study of Income Dynamics (PSID), are documented in considerable detail in Section 2. Throughout this paper, we follow the fortunes of Hispanics, non-Hispanic whites, non-Hispanic blacks, and (to a lesser extent) non-Hispanic Asians, and refer to these as identity groups. For brevity, we drop the qualifier "non-Hispanic" when referring to whites, blacks, and Asians.

The loss in Hispanic wealth (relative to whites) was concentrated among households that owned houses in both 2007 and 2011, and we show—using data from the American Housing Survey (AHS)—that houses owned by Hispanic immigrants lost more value in this period than houses owned by Hispanic non-immigrants, and immigrants or non-immigrants of any other group, even after controlling for metropolitan-level house price changes. Why did Hispanic immigrants fare so poorly in the housing market?

We believe that changes in the treatment of undocumented immigrants played a major role. These immigrants appear to have constituted a large portion of Hispanic homebuyers in the late stages of the boom, and they were effectively shut out of the mortgage market when federal entities—Fannie Mae, Freddie Mac, and the Federal Housing Administration (FHA)—became almost the entire secondary market. These entities cannot purchase mortgages that do not contain a valid social security number.

If housing demand by undocumented immigrants were distributed uniformly across the available housing supply, the collapse in this source of demand would not have had a disproportionate impact on Hispanic wealth. However, we show—using data from the PSID and AHS—that housing demand by immigrants is concentrated on houses already owned by Hispanic immigrants (documented or undocumented). Since around 80 percent of undocumented immigrants are Hispanic (Warren, 2014), events at the start of the Great Recession were a significantly greater shock to this group than to others.

Our main contribution in this paper is to show that (i) Hispanic wealth fluctuations over the boom-and-bust cycle were significantly greater than those for other groups, (ii) household characteristics and location can adequately account for the surge in wealth during the boom but not the severity of the later collapse, (iii) the largest differences in wealth loss between Hispanics and whites were experienced by those who began and ended the recession as homeowners, not those who faced foreclosure or were otherwise compelled to become renters, (iv) homes owned by Hispanic immigrants were especially hard hit by a loss in value, and (v) the demand for these homes came disproportionately from other immigrants, including the undocumented. Taken together, these findings suggest that the sudden collapse in credit availability to undocumented immigrants led, through a contraction in demand for the homes of natural sellers in this market, to a loss in wealth far greater than could be predicted based on household characteristics and location alone.

The paper is organized as follows. In Section 2, we track wealth distributions by identity group over time, after first mapping the wealth of any individual into a percentile of a reference distribution. This shows very clearly the extreme movements in Hispanic wealth relative to those of other groups. We discuss data sources and related literature in Section 3. Section 4 establishes that household characteristics and location can together account for group differences in the boom but not the bust. The undocumented immigrant hypothesis is explored in Section 5, and other alternatives—neighborhood effects, leverage, and the timing of purchases—in Section 6. Section 7 concludes.

2. Ethnicity and Wealth

For our purposes, we need a useful way of summarizing wealth distributions, comparing them, and running regressions with wealth (or a transform) as the dependent variable.[2] Wealth itself is not useful for these purposes because its distribution is highly skewed, because the effect of dummy variables such as marital status or metropolitan area of residence is likely to be multiplicative rather than additive, and because residuals from a linear equation are likely to be heteroscedastic. More importantly, the logarithm of wealth is not defined for many households, because their wealth is non-positive, and we do not want to exclude such households from the analysis. Accordingly, we use percentiles of wealth distributions as our main focus, both for descriptive purposes and for regressions.

Let W_t denote the cumulative distribution function of wealth among whites at year t, where $t \in \{99, 01, \ldots, 11\}$. Hence $W_{99}(y)$ denotes the proportion of white households with wealth at or below y in 1999, and so on. Similarly, let B_t, H_t, and A_t denote the corresponding distributions for black, Hispanic, and Asian households at year t. We shall use W_{99} as a reference distribution in order to track relative and absolute changes in the wealth distributions across groups and over time. For instance, consider a black household with wealth y in year t, and let $p = B_t(y)$ denote the percentile of this household in the year t black distribution. Let

$$F_t^b(p) = W_{99}(B_t^{-1}(p))$$

denote the percentile in the reference distribution that would be occupied by a household at percentile p in the black distribution at year t, and define F_t^a, F_t^h, and F_t^w analogously for the other groups (Asians, Hispanics, and whites, respectively). These are self-maps on [0, 1], and they allow us to track changes in wealth and wealth inequality in a normalized manner.[3]

One advantage of this approach to representing wealth distributions is that it allows for a smooth and continuous treatment of households with positive and negative wealth, especially when considering changes over time. Other studies, some of which are discussed in the literature review below, deal with the problem of non-positive wealth in different ways, for instance by dropping observations, using levels rather than logs, aggregating data into cohorts, or using a transformation of wealth that approximates the log function for positive wealth but is also defined for negative and zero wealth.

Figure 1 plots the self-maps for the three largest identity groups (whites, blacks, and Hispanics) in the baseline year, based on data from the PSID, which we treat for the moment as a repeated cross-section. The function for whites is linear with slope 1 by definition (since this is the baseline group and year). There

[2]Throughout the paper, we define wealth as total assets minus total liabilities, and use wealth and net wealth interchangeably. All monetary values are in 2012 U.S. dollars.

[3]Table A.1 in the Appendix (in the online Supporting Information) shows the dollar wealth level associated with each percentile in the reference distribution and can be used to convert percentiles to dollar values. For instance, black and Hispanic median wealth in 1999 were at the 20th and 21st percentiles of the reference (1999 white) distribution respectively, so median wealth was about $12,400 for blacks, $14,500 for Hispanics, and $123,400 for whites in that year.

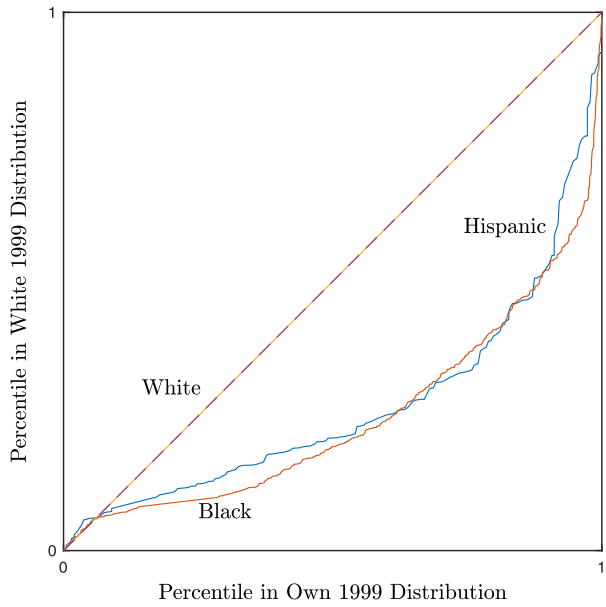

Figure 1. Wealth Distributions by Ethnicity in 1999, PSID

appears to be little difference between black and Hispanic distributions, both of which lie well below the white distribution.[4]

Now consider the evolution of these distributions over the decade 2001–11, shown in Figure 2. As in 1999, the curves for blacks and Hispanics virtually overlap in 2001, and reveal a substantial wealth deficit relative to whites. (Recall that these curves, even for later years, are relative to the 1999 white distribution.) By 2005, a noticeable gap between the black and Hispanic wealth distributions had emerged, and this persisted through 2007. It appears that Hispanics in the top three quintiles of their own wealth distribution gained substantially during the boom. But these gains were almost completely reversed, and by 2011 the black and Hispanic curves are again extremely close. The figure also reveals that wealth inequality *among* whites increased over the decade: those in the lower three quintiles (of their own distribution) lost on balance, while the top quintile was better off than in 1999.

The movements in wealth across groups can also be seen by computing an index on the basis of the area below each curve. Specifically, we use twice the area below the curve as our index, so it ranges between 0 and 2. For the white wealth distribution in 1999, the index equals 1 by construction, and values above (below) 1 mean that the group in question is more (less) wealthy than this baseline group. Table 1 shows the changes in the value of this index over the 1999–2011 period for the three largest identity groups.

[4]In constructing this and subsequent figures, we weight individual observations by the PSID weights required to generate a nationally representative sample in the face of recruitment and attrition. Qualitatively similar patterns arise in the unweighted data.

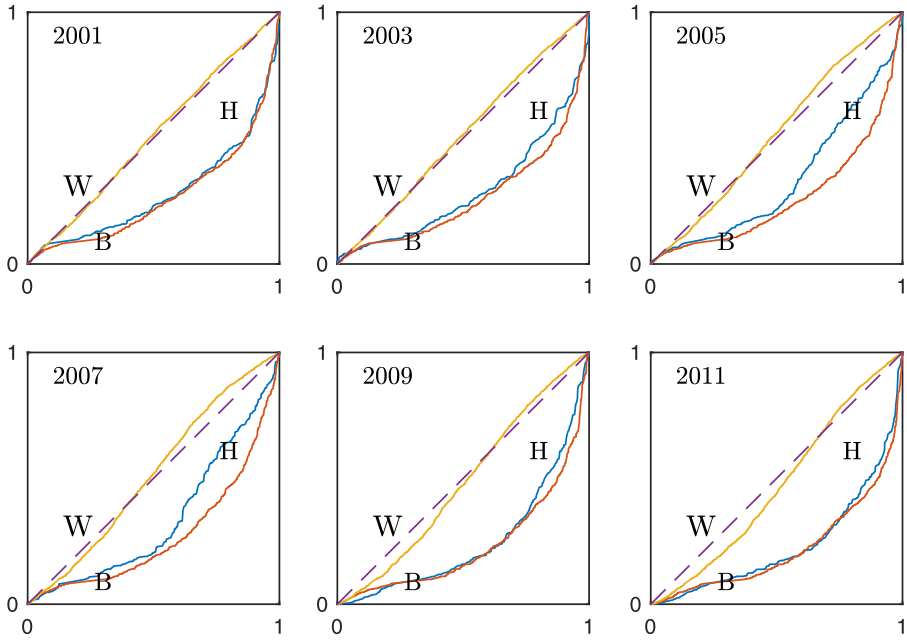

Figure 2. Wealth Distributions by Ethnicity, PSID 2001–11

Several patterns are apparent from the table. Black and Hispanic wealth distributions are similar, but both are substantially lower than the white distribution, which has a wealth index equal to 1 by construction. All groups gain over the period 1999–2007, and all lose over 2007–11, but the magnitude of both rise and decline differs quite a bit across groups. The separation of the Hispanic from the black wealth distribution is apparent in the table: the two groups are close at the start of the period and then again at the end, but much further apart in 2005 and 2007. It is this divergence and subsequent reversal that we seek to explain.

One advantage of using percentile self-maps is that we can easily control for changes in wealth inequality. Perhaps over this period Hispanics and blacks lost ground to whites and Asians simply because the top of the distribution pulled away from the bottom, and Hispanics and blacks were under-represented at the top. We can test and reject this hypothesis with a minor change to the self-maps we have been using.

Instead of comparing each group's distribution in each year with the white 1999 distribution, we can compare it with the contemporaneous white distribution. For instance, for black households at each $t \in \{99, \ldots, 11\}$, define

$$G_t^b(p) = W_t(B_t^{-1}(p)).$$

In the simple story where changes in overall inequality drive the changes in group inequality, a black household at the pth percentile of the white distribution in 1999 remains at the pth percentile of the white distribution throughout the period, and its wealth rises and falls with the wealth of the white household at that percentile. Hence the $G_t^b(p)$ curve would be the same for all p and for all t.

TABLE 1
THE INDEX OF WEALTH BY GROUP, PSID 1999–2011

	1999	2001	2003	2005	2007	2009	2011
White	1.00	1.01	1.02	1.03	1.03	0.97	0.94
Hispanic	0.54	0.57	0.59	0.68	0.68	0.51	0.47
Black	0.50	0.54	0.54	0.53	0.55	0.48	0.45

Figure 3 explores this possibility. For each group g, we show $G^g_{01}(p)$, $G^g_{07}(p)$, and $G^g_{11}(p)$ on the same graph. (We omit the other years to avoid clutter.) Note that $G^w_t(.)$ is always the 45-degree line by definition. Figure 3 shows that distributions computed using a contemporaneous baseline are very similar to those computed using a 1999 baseline. Moreover, under the simple inequality story, the indexes shown in Table 1 should be constant over time for each group when using a contemporaneous rather than 1999 baseline; in fact, it can be shown that these indexes follow essentially the same pattern in both cases. Much more is going on than simple changes in aggregate inequality.

To summarize, the PSID data reveal fluctuations in Hispanic wealth that are substantially greater than those experienced by whites and African Americans. But these data have two serious drawbacks for summarizing changes in aggregate and group wealth distributions over this period. First, all households in the sample were either in the PSID in 1997 or have split off from such households; those entering the country after 1997 are excluded. Second, the number of Hispanics in the sample is small, especially when one restricts attention to continuing homeowners during the boom and bust. For the boom, the total number of such homeowners is 2,338, of whom about 6 percent are Hispanic; for the bust the corresponding figures are 3,280 and 7 percent. Asians are just 1 percent of the sample in both periods.

The Survey of Income and Program Participation (SIPP) has neither of these drawbacks, but has a much shorter panel dimension and skips the crucial year of 2007. Nevertheless, to check for robustness, we constructed our wealth measures for 1999, 2005, 2009, and 2011 using SIPP data. As reported in the Appendix, we find broadly similar trends in SIPP.

One further possible concern arises from the fact that wealth estimates are self-reported. It is conceivable, therefore, that the patterns we observe arise from systematic differences across groups in perceptions rather than actual valuations

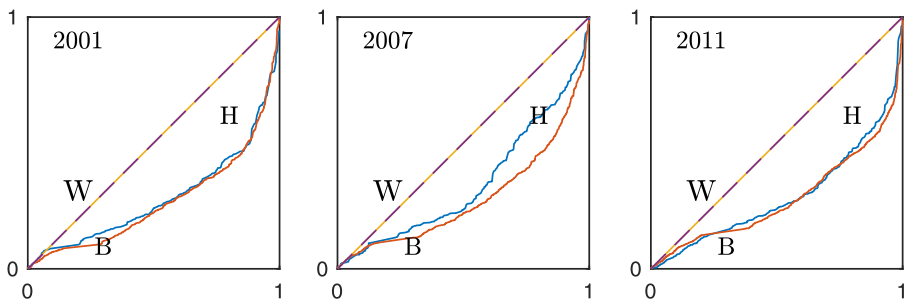

Figure 3. Contemporaneous Wealth Inequality by Ethnicity, PSID

of assets and liabilities. Chan *et al*. (2016) review the literature on whether homeowner estimates are biased and conduct new tests using data from the AHS and the Health and Retirement Study during the Great Recession. They conclude that estimates are not systematically biased by identity group.

Finally, it is important to check for robustness with respect to the reference distribution. As noted by Barsky *et al*. (2002) in their analysis of black–white wealth differences, the choice of reference distribution matters because there are very few members of less affluent groups in the top tail of the white distribution. Accordingly, in the Appendix, we verify that our results are robust to choosing the 1999 black wealth distribution as our baseline.[5]

3. Data and Literature

3.1. *Data*

Empirical work on the characteristics and dynamics of the U.S. wealth distribution has relied on many different datasets, including the Survey of Consumer Finances (SCF), SIPP, and the PSID. Each of these has different strengths and weaknesses. For instance, the PSID includes few households in the upper tail of the wealth distribution, which the SCF is able to reach through a sample based on tax records. But the SCF does not contain detailed information on immigration status, did not use the standard definition of "Hispanic" until 2004, and is not a panel (except for the brief period of 2007–9).

Most studies focus on "fungible" wealth that can be readily used for current consumption, including housing and financial assets, but excluding the value of promised but not marketable retirement benefits (Social Security and private defined benefit pensions). All studies use homeowners' estimates to value houses.

We rely primarily on the PSID and the AHS. While the motivating evidence in Section 2 does not exploit the panel feature of the data, we do so in the analysis to follow. The panel approach has several well-known advantages. It is conceptually simpler, tied more closely to economic theory, and tells us directly about people's lives and well-being, which are the touchstones of most systems of ethical assessment. If, for instance, all Hispanics in the U.S. in 1999 became impoverished by 2007, but average Hispanic wealth rose because of an influx of wealthy immigrants, most observers would probably be reluctant to say that Hispanics in the country were doing well.

At times, of course, the distinction between the panel and repeated cross-section approaches may be small and safely ignored. This happens when populations do not change much, or when later populations are good replicas of earlier ones. But neither condition holds for Hispanics during the period we study. This population grew rapidly and changed substantially—along dimensions that commonly used datasets do not readily capture—between 1999 and 2011.

Concentrating on a panel rather than repeated cross-sections has costs, however. The major cost is that we miss the experiences of households that started

[5]See, in particular, Table A.14 for the boom and Table A.16 for the bust; these correspond to Tables 2 and 3 in the main text, respectively.

after our starting date, and so our results are unrepresentative of households at the ending date (or if we went in the opposite direction, our results would be unrepresentative of households at the starting date). If we just looked at 1999 and 2011, then, we would be excluding the history of over half of the Hispanic households in the U.S. in 2011. The households thus excluded are likely to differ from the households included.

In practice, we reduce this cost somewhat by dividing the period into the boom (1999–2007) and the bust (2007–2011). In 2007, we start a new panel, and so gain the households that entered the PSID between 1999 and 2007. But the PSID added an immigrant subsample only once, in 1997 (and a few more were added in 1999), and so our procedure picks up only households that entered the PSID because they split off from households that were in the U.S. in 1997. It does not pick up households that migrated to the U.S. after 1999, or that split off from households that migrated after 1999, except through marriage into the PSID sample. As we have noted, this is a large proportion of Hispanic households in 2011.[6]

3.2. *The Literature*

In a study that is close to our own in motivation and scope, Faber and Ellen (2016) examine changes in self-reported home equity across different identity groups using longitudinal data from the AHS. Their focus is on differences across groups in absolute changes in home equity over the boom (which they take to be 2003–7) and bust (2007–9). They restrict attention to households that maintained continuous occupancy of the same unit over the entire period. This allows them to control for characteristics of the unit itself and the metropolitan area in which it is located, as well as household characteristics such as income and education, and the initial level of home equity. Their results are roughly consistent with ours as far as the unique experience of Hispanics is concerned: while household characteristics, location, and housing unit properties can account for much of the black–white disparity in home equity evolution over the cycle, the same controls leave much of the Hispanic–white differences in trajectory unexplained. In particular, there is a large and unexplained collapse in Hispanic home equity during the bust, relative to the declines faced by other groups.

Several other papers, using a variety of data sources and methods, also find that blacks and Hispanics were differentially affected by the housing bust. Newman and Holupka (2016) examine experiences of first-time homebuyers during the housing boom and bust using PSID data. They find that unlike whites, who experience significant gains in net worth during the housing boom, blacks did not benefit from the boom and were particularly hard hit by the bust. Mayock and Spritzer (2015) look at returns to homeownership, using proprietary data on more than a million complete homeownership spells in nine large metropolitan markets over the 1990–2013 period. Conditional on location, household income, and timing of purchase and sale, capital gains are lower for black owners in all

[6]Comparing the two panels in 2007, the year when they overlap, median wealth for all groups was considerably higher in the boom than in the bust panel. This partly reflects the fact that older households in 2007 were both wealthier and less likely to continue in the sample until 2011. Sections A.3 and A.4 in the Appendix reconcile the change in the cross-section relative to the change in the panel.

cities, and for Hispanic and Asian owners in seven of the nine cities, in all cases relative to whites. Bayer *et al*. (2016) utilize HMDA data linked to public records on housing transactions and liens for seven metropolitan housing markets, and to proprietary credit rating agency data. They find that conditional on credit scores, loan characteristics, demographics, house type, neighborhood, and lender, black and Hispanic households were significantly more likely to become delinquent and default on their mortgages than white households.

Many studies dealing with the housing boom and bust follow repeated cross-sections of households. Wolff (2014), using data from the SCF, finds that mean net worth among blacks rose 58 percent over the 2001–7 period, double the rate for whites, but median net worth actually declined, with a larger share of blacks having non-positive net worth in 2007 than in 2001. Hispanic growth in mean wealth was even higher, at 82 percent, and the homeownership rate rose by 5 percentage points. For the bust, he finds that median wealth fell far more sharply than housing wealth over the 2007–10 period, and that racial and ethnic wealth disparities widened: "Hispanics, in particular, got hammered. . . in terms of net worth and net equity in their homes." Wolff attributes this to higher leverage and a greater share of wealth in homes among the middle class, in addition to geography and timing: they bought homes later in the boom, and were concentrated in the states—Arizona, California, Florida, and Nevada—where the declines were greatest. Young households also suffered disproportionately large percentage declines.

In a synthetic cohort-level analysis based on the SCF, McKernan *et al*. (2014) also find that younger cohorts had the largest percentage wealth declines during the Great Recession, and that black and Hispanic families lost significantly more than whites. Their estimate of wealth decline is relative to the pre-recession trend, and is considerably larger than that in Wolff's descriptive analysis. Pfeffer *et al*. (2013), using data from the PSID and SCF, find that percentage wealth declines during the Great Recession were largest for those with lower levels of education, lower levels of pre-recession income and wealth, and those identifying as black or Hispanic. Thus wealth inequality rose substantially.

Studies of wealth dynamics prior to the Great Recession are also instructive. Savings behavior, returns to saving, and intergenerational transfers differ systematically across groups, and may have played a role in mediating the impact of the housing boom and bust. See, for example, Barsky *et al*. (2002) and Altonji and Doraszelski (2005) for an examination of black–white wealth inequality using PSID data, and Cobb-Clark and Hildebrand (2006b) for comparisons of the wealth of Mexican Americans and non-Hispanic whites using SIPP data.

Cobb-Clark and Hildebrand (2006a) find an unmistakable "nativity gap" in net worth, with foreign-born residents having lower wealth using SIPP data for 1987–96. They divide the sample by place of birth, rather than heritage, and look at immigrants from all countries, not just Mexico. The wealth gap appears at all points of the wealth distribution, but is greatest at lower percentiles, and remains even after controlling for a number of characteristics. Immigrants differ from native-born U.S. residents with respect not only to net worth (even controlling for other characteristics), but also to savings behavior and asset allocation. We return to the question of immigrant status and discuss further related literature in Section 5 below.

4. Household Characteristics and Location

The most obvious explanation for variations across groups in the amplitude of wealth fluctuations is location: if Hispanics were disproportionately likely to reside in those regions that experienced greatest fluctuations in home values, then movements in their wealth would mechanically exhibit greater amplitude. In addition, variations across groups in household characteristics that affect the manner in which wealth is held could also give rise to fluctuations of different amplitude. We explore these hypotheses next, and show that—taken together—they do an adequate job of accounting for the boom but not for the bust.

4.1. *The Boom*

For the boom, we restrict attention to those households present in the sample throughout the period 1999–2007, and estimate a series of equations that are all nested in the following specification:

$$W_{07,i} - W_{99,i} = \alpha + \beta_B B_i + \beta_H H_i + \beta_A A_i + \omega W_{99,i} + \gamma X_{99,i} + \gamma X_{07,i} + \theta P_{99,07,i} + \mu P_{99,07,i} * O_{99,i} + \varepsilon_i. \quad (1)$$

Here, $W_{t,i}$ denotes the wealth of household i in year t, measured as a percentile in the 1999 white distribution; B_i, H_i, and A_i are dummy variables equal to one if and only if the household is recorded as black, Hispanic, or Asian, respectively, $X_{t,i}$ is a vector of household characteristics in year t that refer to neither identity nor location, $O_{t,i}$ equals 1 if household i was a homeowner in year t and zero otherwise, and $P_{t,s,i}$ is the percentage change in the Federal Housing Finance Agency (FHFA) House Price Index (HPI) between t and s for the MSA in which household i lived in year t. Because whites are the excluded category, the constant α is the characteristics-corrected change in wealth rank for whites between 1999 and 2007.

Table 2 shows the results of fitting the above equation (full regression results for this and all subsequent tables are available in the Appendix). Because the PSID has a multi-stage complex sample design that includes special features such as stratification, clustering, and differential selection probabilities, we compute standard errors using a Taylor series linearization of the estimator (and its variance approximation).[7] In column (1), we report simple means without controls, which confirm that for each group, wealth (as measured by position in the reference white 1999 wealth distribution) rose several points, with Hispanic and Asian wealth rising much more than that of whites and blacks. In particular, we find that whites gained 7 percentage points between 1999 and 2007, but that Hispanic wealth increased by an additional 8.6 percentage points.

Column (2) adds a homeownership dummy as well as controls for all other household characteristics in $X_{99,i}$. These are unrelated to identity and location: a quadratic polynomial in age, number of years of completed education, marital

[7]For a detailed description of the sampling error computation methods recommended by the PSID staff and used in our analysis, see Heeringa *et al.* (2011). Other suggested procedures, JRR and BRR, lead to similar results.

TABLE 2

The Change in Wealth Relative to the White 1999 Distribution, PSID 1999–2007

	Full Sample				MSAs Only		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Black	−0.754	−0.135	−3.029***	−1.085	−3.103**	−3.202**	−1.136
	(1.210)	(1.200)	(1.068)	(0.908)	(1.492)	(1.326)	(1.159)
Hispanic	8.572***	8.976***	7.456***	6.764***	6.794**	2.752	3.426
	(2.089)	(1.989)	(1.946)	(1.606)	(3.060)	(2.604)	(2.176)
Asian	10.306***	7.701**	8.876***	6.863***	6.681*	5.848	1.700
	(3.146)	(3.099)	(2.656)	(2.073)	(3.779)	(4.134)	(3.089)
Homeowner in 1999		−0.862	7.404***	−2.352**	8.177***	5.811**	−0.151
		(1.280)	(1.394)	(1.173)	(1.939)	(2.882)	(2.784)
Wealth rank in 1999			−0.373***	−0.429***	−0.405***	−0.415***	−0.461***
			(0.021)	(0.019)	(0.032)	(0.030)	(0.026)
Homeowner in 2007				23.425***			13.901***
				(0.955)			(2.157)
Renter in 1999 ×ΔHPI						6.573***	12.132***
						(2.280)	(3.021)
Homeowner in 1999 ×ΔHPI						10.841***	11.780***
						(1.598)	(1.261)
Renter in 2007 ×ΔHPI							−12.613***
							(3.201)
Constant (white)	7.025***	11.837***	2.792	−9.720	4.643**	−0.704	11.193
	(0.486)	(2.390)	(2.387)	(10.183)	(2.211)	(2.777)	(11.877)
Observations	4,628	4,628	4,628	4,548	2,397	2,397	2,349
R^2	0.01	0.10	0.21	0.40	0.24	0.27	0.44
$X_{99,i}$	No	Yes	Yes	Yes	Yes	Yes	Yes
$X_{07,i}$	No	No	No	Yes	No	No	Yes

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors are corrected for multi-stage sample design. The dependent variable is the change in wealth position in the 1999 white wealth distribution between 1999 and 2007. The base group is white, married, and working in the service industry. The wealth rank is centered around the median. The FHFA HPI index is based on sales prices and appraisal data at MSA level.

status, number of adults and children currently in the household, age of the youngest child, real family income earned last calendar year, unemployment and retirement status, and industry of employment dummies (all demographic variables reference the head of household).[8] Conditional on demographics, whites gained almost 12 percentage points between 1999 and 2007, while Hispanic wealth went up by an additional 9 percentage points in the reference distribution.

[8]Summary statistics for these variables can be found in Table A.3. On average, white household heads were significantly older than those of other groups (eight years older than Hispanics, and five years older than blacks). This disparity in age distributions is one factor that could be relevant in accounting for the unusual wealth dynamics for Hispanics. Wolff (2014) argues that younger households lost disproportionately large amounts of wealth during the bust, in part because they had purchased homes more recently and had higher debt-to-equity ratios. We control for age of household head in all our regressions, and find a statistically significant age effect in some but not all specifications. Hispanics and blacks had more and older children than whites or Asians. Hispanic families also had more adults, partly because they were more likely than others to be married.

In column (3), we add initial wealth positions in the reference distribution, and find that those who began with greater wealth saw their wealth position improve more slowly.[9] Keeping all else constant, a one percentage point higher standing in the initial 1999 white wealth distribution is associated with a 0.37 percentage point smaller change in wealth between 1999 and 2007. We include initial wealth position as a control to reflect any general changes in wealth inequality, to allow for returns on wealth, to correct for the bounding of our wealth measure to the unit interval, and to allow for a more flexible interpretation of the results, since change in wealth for Hispanics and blacks was concentrated in the upper tail of the wealth distribution.

The results for both blacks and Hispanics are interesting and contrary to popular impressions. For blacks, loosening of the secondary mortgage market and the subprime boom did not raise their wealth relative to whites. If anything, their wealth fell relative to whites once we control for initial wealth conditions, consistent with the findings reported by Newman and Holupka (2016). For Hispanics, the frequent pairing with blacks as "disadvantaged minorities" is not appropriate here. For wealth in the boom, the appropriate dichotomy seems to be between groups long in the U.S. (blacks and whites) and newcomers (Hispanics and Asians).

The use of household characteristics at the start of the period as controls is restrictive, because it takes no account of changes in non-racial characteristics over the period that were systematically different across groups. For instance, the industry composition of Hispanic employment changed greatly during the boom: manufacturing jobs were replaced by service jobs, and the share of employed Hispanics working in construction more than doubled, rising to 11 percent. It is conceivable that Hispanic income rose over the period more than that of other groups to a degree that was not predicted by initial non-racial characteristics, and Hispanic wealth rose because income rose. To account for this possibility, we add end of period values of the homeownership dummy and all other variables in $X_{07,i}$, as listed above. (This is equivalent to adding changes in these variables relative to 1999.)

Column (4) of Table 2 reports the results for this specification. The picture changes only slightly. While family income rose somewhat faster for Hispanics than for whites or blacks, and Hispanics and Asians moved from manufacturing to services and construction, these changes are not large enough to explain the relative rise in wealth for Hispanics or Asians.[10] The inclusion of 2007 information reinforces our original finding that Hispanic wealth rose faster than white wealth in a statistically significant way during the 1999–2007 period.[11] Specifically, the coefficients imply that by 2007, Hispanic and Asian households had gained almost 7 percentage points more in the reference wealth distribution

[9]This does not mean, of course, that wealth at the top grew more slowly: those close to the top of the reference distribution in 1999 could not rise much further in percentile units no matter how fast their wealth grew. We experimented with a quadratic function in initial wealth, but found that in the boom a linear specification fitted the data better.

[10]For details, see the summary statistics in Table A.3.

[11]Since many of the end-of-period variables are not plausibly exogenous to the change in wealth, this procedure probably overstates the contribution of non-racial variables to the change in wealth. We consider this regression as providing an upper bound on the impact of non-racial variables, while that based only on initial conditions provides a lower bound.

than white (or black) households that were identical in other characteristics in both 1999 and 2007 (including the 1999 wealth position). This translates to a gain of roughly $31,200 for the median Hispanic household in 2007 ($89,300 vs. $58,100) and a gain of $88,300 for the median Asian household ($404,800 vs. $316,500).[12]

The hypothesis implicit in columns (1)–(4) is that non-racial household characteristics determined how the economy treated the household's wealth during the boom, and so different identity groups experienced the period differently solely because they started from different non-racial initial conditions. We reject this hypothesis, since the coefficients on the identity group variables are significantly different from zero.

The next step is to control for household location, using detailed geographic identifiers available from the restricted-use dataset provided by the PSID. The use of the FHFA house price index for Metropolitan Statistical Areas (MSAs) requires us to drop from the sample those households that reside outside metropolitan areas. Before adding any location variables, therefore, we estimate the specification in column (3) using only the restricted sample; the results are reported in column (5). The sample restriction only marginally affects the results; the magnitudes of the coefficients remain similar.

Finally, we add the location-specific variables: the change in house price index over the boom, and this change interacted with ownership status.[13] The reason for adding the interaction is that house price appreciation should primarily affect homeowners. However, it might also affect household members who were not homeowners initially either because they became homeowners at some point during the boom, or because house price appreciation might reflect general prosperity in a metropolitan area. So house price appreciation without the interaction also merits inclusion.

The results are reported in columns (6) and (7), which reproduce the specifications in columns (3) and (4) but with location controls added. The addition of the house price appreciation variables, even in this crude form, significantly reduces the magnitude of the Hispanic coefficient and removes its statistical significance, but barely moves coefficients on the black dummy. In particular, once we control for location, the difference between Hispanic and white wealth disappears. The difference between the results is economically meaningful as well. According to the specification in column (6), Hispanics gained about 3 percentage points in the wealth distribution, or $16,000, relative to the estimated gain of

[12]To convert percentiles into dollars, we combine information on the median wealth percentile by ethnicity from the Table A.2 1999–2007 continuers columns with information from the reference wealth distribution from Table A.1. In 2007, a median Hispanic was at the 43rd percentile of the reference wealth distribution and had about $89,300 in net wealth. According to our estimates in column (4), Hispanics gained about 7 percentage points between 1999 and 2007, placing them at the 36th percentile of the reference distribution in 1999, with wealth of almost $58,100. Therefore, Hispanics gained about $31,200 between 1999 and 2007.

[13]We use the FHFA HPI index that is computed using sales prices and appraisal data; for the list of included MSAs, refer to FHFA website. We separately explore a more restricted sample of 100 MSAs for which HPI is computed on sales price data alone, and check for robustness of our results to the inclusion of households residing outside of MSAs by appending state-level HPI to the MSA HPI information. We find similar results for these samples.

$31,200 before we controlled for HPI appreciation and other 2007-level characteristics. Moreover, controlling for changes in demographics, income, and place of work removes any differential in black and Asian wealth accumulation relative to whites as well.

Note, however, that although adding MSA-specific housing price changes to our estimating equation makes the coefficient on Hispanic identity group insignificant, and smaller than it was without this variable, it remains positive and sizable (about 3 percentage points). It is not impossible that other factors are also raising Hispanic wealth, but if so they are not strong enough to be picked up in this sample. In an unreported regression, we found that if we confine our attention to the height of the boom, the Hispanic coefficient remains significant despite the addition of MSA-specific housing price change. But it is fairly small.

The findings in Table 2 suggest that demographic and income changes alone cannot fully account for the differential increase in wealth for Hispanic households relative to whites, but can do so in conjunction with location characteristics. To a first approximation, Hispanic wealth rose faster than white wealth in the boom because Hispanics were in the right place at the right time. In Section A.5 of the Appendix, we check this conclusion against house value data from the American Housing Survey (AHS); the results are confirmatory.

To conclude, Hispanic house price appreciation was greatest during the boom, and this is why Hispanic wealth grew more than white wealth. Glaeser *et al*. (2008) have argued that house price volatility is greatest in metropolitan areas with less elastic housing supply, so one possible mechanism is that Hispanics were disproportionately likely to be found in such cities. But there are other possibilities, and we remain agnostic about why Hispanic residence and house price appreciation were correlated across cities.

Might Hispanic residence have *caused* the MSA house price appreciation that we observe? Saiz (2011) and Saiz and Wachter (2011) have identified causal effects of Hispanic population growth on MSA-level price appreciation for the 1980–2000 period, but this appreciation was in largely white neighborhoods rather than in neighborhoods into which migrants were flowing (a possible mechanism is white flight from neighborhoods with growing Hispanic populations). This would not account for the growth in Hispanic wealth. It is possible that the periods studied by Saiz (2011) and Saiz and Wachter (2011), which have no overlap with the period considered here, had different patterns of appreciation. In particular, it may be that home values in largely Hispanic neighborhoods became especially untethered from fundamentals during the housing boom.

4.2. *The Bust*

Since the household characteristics and location of Hispanics accounted for movements in their wealth position during the boom, we begin by applying the same strategy to the bust. That is, we estimate a sequence of equations nested in equation (1), but with W_{07}–W_{11} replacing W_{99}–W_{07} as dependent variables, and replacing explanatory variables with the 2007 and 2011 instead of 1999 and 2007

values, respectively. This requires the use of a somewhat different panel of households—those who were present at the beginning and end of the bust.[14]

The results are shown in Table 3. The first column reports means without controls, from which we see that Hispanics lost significantly more wealth during the bust than any other group. This result remains unchanged after we control for initial (2007) household characteristics and allow for non-linear effects of the initial wealth position in column (2), and add the end-of-period characteristics in column (3).[15] The coefficient for blacks becomes larger (in absolute value) and significant as we add controls, although it remains statistically different from and much smaller than the Hispanic coefficient. With column (3) values, the 8 percentage point difference between white and Hispanic households with the same characteristics in both 2007 and 2011 was equivalent to about a $20,400 gap in wealth at the 2011 Hispanic median ($12,400 vs. $32,800). On the other hand, the 4 percentage point difference between white and black households was equivalent to about a $4,000 gap in wealth at the 2011 black median ($1,800 vs. $5,800).

Next, we control for house price changes at the MSA level, which involves restricting the sample to residents of metropolitan areas as before. Columns (4)–(6) of Table 3 report these results. Blacks and Hispanics experienced a similar reduction in wealth (in percentage points), once we control for changes in demographics, initial conditions, and the change in the HPI (column (5)). We find that a 1 percentage point drop in HPI is associated with a 0.23 percentage point drop in wealth for 2007 homeowners and a 0.09 percentage point drop for 2007 renters. Conditioning on changes in house prices and also controlling for 2011 characteristics (column (6)), we find that blacks lost wealth relative to whites and Asians, but not as much as Hispanics did. Moreover, the differences are economically significant. With column (6) values, the 6.5 percentage point difference between white and Hispanic households with the same characteristics in both 2007 and 2011 was equivalent to about a $13,000 gap in wealth at the 2011 Hispanic median ($19,800 vs. $32,800). On the other hand, the 4.5 percentage point difference between white and black households was equivalent to about a $4,300 gap in wealth at the 2011 black median ($1,500 vs. $5,800). This holds across specifications and across samples. The bust was not the boom in reverse. Something else was happening that led Hispanics to suffer larger wealth losses.

4.3. *Homeownership History*

As a first step in figuring out what drove down Hispanic wealth to such a degree, we partition the sample into four components based on homeownership

[14]Summary statistics for this set of households can be found in Table A.4. As in the boom, whites and Asians were on average older than Hispanics and had more years of completed education. In 2007, Hispanics had on average the highest marriage rates and bigger families, with more children and adults than other identity groups. In our sample, family incomes dropped for all groups (in different proportions). Homeownership rates increased slightly for Hispanics, blacks, and Asians, but average home values and average wealth dropped for these groups disproportionately.

[15]As in Table 2, additional characteristics included in $X_{t,i}$ but not explicitly listed here are a quadratic polynomial in age, number of years of completed education, marital status, number of adults and children currently in the household, age of the youngest child, real family income earned in the last calendar year, unemployment and retirement status, and industry of employment dummies (all demographic variables reference the head of household).

TABLE 3

The Change in Wealth Relative to the White 1999 Distribution, PSID 2007–11

	Full Sample			MSAs Only		
	(1)	(2)	(3)	(4)	(5)	(6)
	b/se	b/se	b/se	b/se	b/se	b/se
Black	−1.269	−4.631***	−4.296***	−5.441***	−5.243***	−4.475***
	(1.041)	(1.027)	(1.008)	(1.372)	(1.228)	(1.177)
Hispanic	−8.518***	−7.937***	−7.766***	−7.756***	−4.902***	−6.568***
	(1.779)	(1.500)	(1.495)	(2.048)	(1.809)	(1.728)
Asian	−2.794	−0.956	−1.222	0.596	0.750	−0.090
	(1.921)	(1.577)	(1.623)	(2.688)	(2.593)	(2.630)
Wealth rank in 2007		−0.304***	−0.335***	−0.302***	−0.275***	−0.306***
		(0.017)	(0.016)	(0.028)	(0.028)	(0.028)
Wealth rank in 2007, squared		0.004***	0.004***	0.004***	0.004***	0.004***
		(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Homeowner in 2007		1.792**	−7.471***	1.734	3.655***	−7.568***
		(0.692)	(1.048)	(1.036)	(1.115)	(1.298)
Homeowner in 2011			15.516***			19.130***
			(1.405)			(1.970)
Renter in 2007 ×ΔHPI					0.092**	0.219***
					(0.041)	(0.068)
Homeowner in 2007 ×ΔHPI					0.235***	0.268***
					(0.039)	(0.034)
Renter in 2011 ×ΔHPI						−0.163**
						(0.075)
Constant (white)	−3.063***	−3.279**	−11.038***	−5.134*	−4.416	−7.980
	(0.401)	(1.564)	(3.431)	(2.965)	(2.719)	(5.502)
Observations	6,351	6,351	6,264	3,347	3,347	3,302
R^2	0.01	0.19	0.27	0.18	0.20	0.31
$X_{07,i}$	No	Yes	Yes	Yes	Yes	Yes
$X_{11,i}$	No	No	Yes	No	No	Yes

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors are corrected for multi-stage sample design. The dependent variable is the change in wealth position in the 1999 white wealth distribution between 2007 and 2011. The base group is white, married, and working in the service industry. The wealth rank is centered around the median. The FHFA HPI index is based on sales prices and appraisal data at MSA level.

history. This can take one of four values: continuous ownership (the household owned its home in both 2007 and 2011); continuous renting (the household rented in both years); homeownership entering (the household rented in 2007 and owned in 2011); and homeownership leaving (the household owned in 2007 and rented in 2011).[16]

In Table 4, we report the results of a regression with change in wealth position between 2007 and 2011 as the dependent variable, where we include the usual controls as in Table 3 column (5), including demographics, initial conditions, change in HPI at MSA level, and a dummy variable for a household's

[16]Our language here may be somewhat misleading: we define continuous owners based only on their homeownership history in 2007 and 2011. Thus, it is conceivable that the actual homes owned by the continuous owner are not the same in 2007 and 2011, and that they sold and bought homes in between. In our sample, however, only 35 out of 1,775 continuous homeowners actually changed MSA sometime between 2007 and 2011; only three of these 35 were Hispanic, and 30 were white.

TABLE 4

The Regression-Adjusted Average Wealth Position Change by Identity Group and Homeownership History Relative to White Continuous Owners, PSID 2007–11

	White	Black	Hispanic	Asian
Continuous owners	0.00	−8.40***	−10.33***	0.90
Continuous renters	−10.41***	−13.96***	−10.88***	−14.93***
Homeownership entrants	3.24	−2.61	6.70	4.12
Homeownership leavers	−24.76***	−11.77	−23.74***	−44.08***

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Statistical significance with respect to white continuous homeowners; sample restricted to MSA residents. Standard errors are corrected for multistage sample design.

homeownership history interacted with identity group. The excluded category in this regression is white continuous owners, and the sample is restricted to MSA residents. Thus Table 4 shows, for each homeownership history group within each identity group, how much its experience in the bust differed from that of white continuous owners.

Looking across rows in Table 4, we see that only among continuous homeowners did Hispanics fare noticeably worse than whites. Black continuous owners also fared much worse than white continuous owners. Hispanic entrants did better than white entrants, and Hispanic continuous renters and homeownership leavers were indistinguishable from their white counterparts. Whatever was different about the Hispanic experience in the bust, relative to the white experience, it primarily affected continuous owners.

Of course, since wealth losses differed greatly and systematically among homeownership history groups in every identity group, relative population sizes within identity groups also matter. For instance, since homeownership leavers had the greatest wealth losses within every identity group, the disproportionate Hispanic wealth loss might be due to a disproportionately large homeownership leaving group, not the greater losses among continuous owners. Table 5 shows the population weights within identity groups of the different homeownership history groups. The differences between whites and Hispanics are not great, and in many ways offsetting. To understand why Hispanics lost more wealth than whites in the bust, we must explain Table 4, and in particular the experience of continuous owners, not Table 5.[17]

Note that households that experienced foreclosures and short sales are categorized as homeownership leavers. Hispanics were less likely than whites to be homeownership leavers, and those who were lost the same amount of wealth that white homeownership leavers lost. Foreclosures and short sales do not explain why Hispanics lost more wealth in our sample. We need to consider why those who held on to their homes lost disproportionately large amounts of wealth if they were Hispanic. This leads us to the undocumented immigrant hypothesis.

[17]Table 5 may be more useful in explaining the large losses that black households suffered in the bust, since they were disproportionately continuous renters, and continuous renters lost more than continuous owners. Why blacks lost so much wealth in the bust is an important question, and one on which work should be done, but it is not the topic of this paper.

TABLE 5
THE DISTRIBUTION OF HOMEOWNERSHIP HISTORIES BY GROUP, PSID 2007–11

	White	Black	Hispanic	Asians
Continuous owners	67.0	35.7	58.1	82.8
Continuous renters	20.8	54.8	29.8	10.4
Homeownership entrants	5.2	5.0	7.2	4.1
Homeownership leavers	7.0	4.5	5.0	2.8
Total	100.0	100.0	100.0	100.0
Observations	1,782	1,258	241	29

Note: Sample restricted to MSA residents.

5. THE UNDOCUMENTED IMMIGRANT HYPOTHESIS

5.1. *Background*

In general, undocumented immigrants face two difficulties in securing mortgages and buying houses that citizens and documented immigrants do not encounter: they usually lack social security numbers, and they often lack well-documented records of earnings. Before the Great Recession, however, many undocumented immigrants found ways to overcome these difficulties: in 2008, for instance, almost half of undocumented immigrant household heads who had been in the U.S. for a decade or more owned their homes (Passel and Cohn, 2009).

For immigrants without social security numbers (SSNs) who had records of employment, some lenders allowed individual taxpayer identifying numbers (ITINs) to substitute for SSNs. The Internal Revenue Service began issuing ITINs in 1996 (Hernandez, 2003), and during the boom many mortgage originators, including some large banks, accepted ITINs (McConnell and Marcelli, 2007). Starting in 2001, the Mexican government provided an identifying document called the *matrícula consular* to nationals living abroad. These were also accepted for mortgage loans by many institutions, including Citigroup, Washington Mutual, Bank of America, Wells Fargo, and Fifth Third Bank in some markets (McConnell and Marcelli, 2007). Private mortgage insurance was also available. However, Fannie Mae, Freddie Mac, and the Federal Housing Administration (FHA) have never purchased loans without SSNs. ITIN and matrícula loans, therefore, were either held in portfolio or securitized in the private label market.

For immigrants who had been working "off the books," no-doc and low-doc mortgages (sometimes also called "liar loans" or "stated income mortgages") were a common substitute for earnings records. These loans did not require proof of earnings. No-doc and low-doc loans accounted for possibly almost half of newly-issued mortgages at the height of the boom (Fitch (2010)). A few mortgage originators, especially credit unions with ties to the Latino community, also constructed earnings histories from fragmentary evidence, essentially substituting hard work for convenient records.[18]

[18]Based on interviews with borrowers in Oakland and Stockton, Reid (2010) argues that members of minority groups, especially Hispanics, sought out brokers from their own communities whom they felt they could trust, and brokers in turn cultivated these relationships, then capitalized the trust into greater compensation for themselves at the expense of unwitting borrowers. Undocumented status could explain why Hispanics relied so much on co-ethnics, and why they trusted non-Hispanics less.

In areas with large and established undocumented communities, these mechanisms may have removed almost the entire handicap that undocumented immigrants faced. McConnell and Marcelli (2007) studied a cross-section of Mexican immigrants in the Los Angeles metropolitan area, and could not reject the hypothesis that immigration status had no impact on the probability of owning a home in 2001, once other standard variables were controlled for. Writing in 2007, they said: "Such developments [ITIN and matrícula loans] coupled with the continuous growth of the subprime mortgage market... suggest that many of the traditional barriers to homeownership for undocumented Mexican immigrants have been further reduced in Los Angeles and in other parts of the country" (p. 217). Haurin and Rosenthal (2009) provide some indirect evidence of how undocumented immigrants were able to buy homes.

Getting a mortgage became much harder for undocumented immigrants in the Great Recession. No-doc and low-doc mortgages essentially disappeared (Fitch, 2010). Private label securitization also effectively ended; see Figure 4. When private label securitization vanished, ITIN and matrícula loans could no longer be sold into the secondary market, and most private lenders became reluctant to hold them in portfolio.

Working "on the books" also became harder for undocumented immigrants, largely because of the spread of E-verify. E-verify is an online system maintained by the federal government that allows employers to check the immigration status of prospective employees. All federal contractors were ordered to use E-verify in September 2007, and the first major public relations push for voluntary use of the system began the same month. Also beginning in 2007 with Arizona, some states required all employers to use E-verify or an equivalent system; by 2011, ten states required almost all employers to use E-verify, and another six required state and local contractors and subcontractors NumbersUSA (2015). California, however, forbids the use of E-verify by private employers.

E-verify may have reduced the proportion of undocumented immigrants who could compile an earnings record that could qualify them for a mortgage, and the proportion who paid income taxes and so qualified for an ITIN. However, we did not find that state level variation in E-verify laws was a significant factor in accounting for the housing market experience of Hispanics during the bust. It appears that the collapse of private label securitization, which occurred across all states regardless of labor market enforcement, was considerably more important in stopping the flow of credit to undocumented potential homebuyers.

Could the changes in mortgage availability for undocumented immigrants have affected the value of houses that Hispanic immigrants owned in 2007? There are three necessary conditions for this to have occurred.

First, credit market events must be able to affect housing prices. This relationship has been demonstrated often in the literature. Most relevantly, Kung (2015) studied changes in eligibility for conforming loans—loans that Fannie Mae and Freddie Mac purchased—in 2008 in Los Angeles and San Francisco. When a loan to purchase a house became conforming, the house's price rose by around 6 percent. More generally, Mian and Sufi (2014, pp. 80–85) argue that house prices rose in the boom because credit supply became more generous (not that credit supply became more generous because house prices rose). Anenberg

Figure 4. GSE vs. Private-Label Mortgage Issuance Amounts

Note: GSE loans include all agency (FNMA, FHLMC, and GNMA) MBS issued mortgages. Private-label loans are RMBS loans by other, non-agency, private lenders (Source: simfa.org).

et al. (2016) show that credit supply restrictions (restrictions on the quantity of credit, not its price) account for one half to two thirds of the rise in house prices in the boom and three quarters of the fall in house prices in the bust; they use MSAs as their unit of observation. The exclusion of undocumented immigrants from mortgages sold on the secondary market is the type of credit supply restriction that they study.

Second, houses owned by Hispanic immigrants must not be perfect substitutes for other houses in the same metropolitan area; otherwise the reduction in demand that the credit market changes caused would affect all houses equally. It is unlikely that these houses differed from other houses in structural characteristics. It is possible that neighborhoods mattered, and natives tended to avoid neighborhoods in which immigrants predominated, as Saiz and Wachter (2011) demonstrated for the late 20th century. But geography and structure are not the only way in which houses can be imperfect substitutes for each other.

Social and informational networks may matter in this case: houses owned by immigrants may not be perfect substitutes for other houses because immigrants may be more likely to hear about them than about houses owned by natives, and natives may be less likely to learn about immigrant-owned houses than about native-owned houses. A person cannot make a bid on a house unless she knows it is for sale. Realtors who specialize in different groups of potential buyers (for instance, by speaking Spanish and learning about ITIN loans) may facilitate these networks. Haurin and Rosenthal (2009) provide some evidence that social networks affected the home-buying behavior of Hispanics with limited English

proficiency. The observations of Reid (2010) on the dependence of Hispanic homebuyers on co-ethnic networks for all financial matters are also relevant here. For Hispanic immigrant continuous owners, this network means that they would have more difficulty selling their houses after 2007 if they placed them with a realtor who specialized in working with Hispanic buyers, that they would be less likely to be solicited by the realtors whom they knew (or any realtors who spoke their language), and that they would observe many fewer sales of houses by their friends and acquaintances. Undocumented Hispanic immigrants, facing an increasingly hostile legal and political environment after the start of the Great Recession and unfamiliar with laws, language, and customs in the U.S. might understandably be reluctant to try to sell their houses—their most important investments—without trusted co-ethnic intermediaries, and those intermediaries might not be able to function frictionlessly in the wider economy.

The final necessary condition is that undocumented immigrants before 2007 must have been a large proportion of prospective buyers in the markets in which Hispanic immigrants contemplated selling their houses. This was indeed the case. At the height of the boom, close to a majority of Hispanic immigrants were undocumented. For the U.S. population in 2010, Massey (2015) finds that among Latin American immigrants, the share of undocumented was 56 percent. The category of "Latin American immigrants" does not include Caribbean immigrants (Cubans and Dominicans mainly) who were more likely than other Hispanic immigrants to be documented, and so this proportion is probably too high for 2010. On the other hand, the total undocumented population fell by about a tenth from 2007 to 2009 Hoefer *et al*. (2011), and so the Massey figure may be an understatement for 2007. By contrast, only 14 percent of Asian immigrants in 2011 were estimated to be undocumented. Thus if undocumented immigrants were buying houses in 2007 at approximately the same rate as documented immigrants, they would be a major part of this market.

We can get some insight into the participation of undocumented immigrants in the owner-occupied housing market by looking at homeownership rates. In 2008, about 35 percent of households headed by undocumented immigrants owned their own houses: 27 percent of those who had been in the U.S. for less than a decade, and 45 percent of those who had been in the U.S. a decade or more Passel and Cohn (2009). Since the vast majority of undocumented immigrants are Hispanic, the homeownership rate for undocumented Hispanic immigrants could not have been far from this. Overall, the homeownership rate for foreign-born Hispanics was 45 percent in 2008 (Kochhar *et al*., 2009). If undocumented immigrants were about half of total Hispanic immigrants, then they would have owned about 40 percent of the houses that Hispanic immigrants owned in 2008.

This is a stock figure, not a flow figure. We are interested in the rate at which undocumented immigrants were buying houses at the end of the boom, not the rate at which they owned houses. In the steady state, the two rates are the same, but the boom was not a steady state. Since ITIN and matrícula loans, no-doc loans, and low-doc loans were recent innovations that probably caused undocumented immigrant homeownership rates to rise, and because the proportion of undocumented immigrants who had been in the U.S. for a decade or more was

also rising, the Hispanic undocumented immigrant homeownership rate was probably rising during the boom, and would have kept rising if the boom had not ended. If that were so, then the proportion of undocumented among Hispanic immigrant homebuyers in 2007 would have been greater than 40 percent.

Thus we are fairly confident that a major proportion of the Hispanic immigrants who were buying homes toward the end of the boom were undocumented. Their exit from the market could have had a major impact.

Note that the undocumented immigrant hypothesis implies little or nothing about the boom. This is because all borrowers (regardless of immigration status) had access to the more permissive mortgages that required little or no documentation during the boom. In particular, it does not imply that mortgage originations by Hispanics should have been more heavily securitized by private-label firms than mortgage originations by other groups; nor does it imply that house prices should have risen more steeply for Hispanic immigrants or in communities with many Hispanic immigrants. A direct test of the undocumented immigrant hypothesis would require information on state-level lending environments to undocumented immigrants before and after the bust. To our knowledge, this information does not exist.

5.2. *Evidence*

A necessary condition for the undocumented immigrant hypothesis is that demand by undocumented immigrants be concentrated in specific sub-markets (not necessarily defined geographically); if undocumented immigrants purchased randomly throughout metropolitan areas then their disappearance from the market would have affected every identity group equally (holding MSA constant). We can check whether this necessary condition is satisfied in the AHS, even though we do not have direct information on which immigrants are undocumented. We define immigrants as those heads of household born outside of the U.S., whether they are naturalized or not. Controlling for citizenship gives similar results.

Table 6 shows that immigrant demand is highly concentrated on the houses that immigrants already own. Looking at house sales that took place between 2007 and 2011, this table reports results from regressions using AHS data, where the dependent variable is 1 for houses owned by an immigrant household in 2011, and zero otherwise. Columns (1) and (2) include all ethnic groups; in columns (3) and (4), the dependent variable is 1 if the household head was Hispanic immigrant in 2011, and zero otherwise; and in columns (5) and (6), we examine Asian immigrants. The sample is restricted to identifiable MSAs. We regress immigration status dummy for 2011 owner on immigration-ethnicity status dummy of 2007 homeowner. We do not control for any other demographics or housing unit characteristics in these regressions, except for MSA fixed effects, when specified.

During the 2007–11 period, immigrants tended to sell to immigrants and this relationship was strongest for Hispanic immigrants (columns (3) and (4)). In 2011, Hispanic immigrants bought only from Hispanics, and in particular from Hispanic immigrants. In particular, within MSAs, 28 percent of houses bought by Hispanic immigrants were purchased from other Hispanic immigrants, and almost 14 percent of houses from Hispanic non-immigrants. Asian immigrants

TABLE 6
IMMIGRANTS SELL TO IMMIGRANTS, AHS 2007–11

	All		Hispanics		Asians	
	(1)	(2)	(3)	(4)	(5)	(6)
	b/se	b/se	b/se	b/se	b/se	b/se
Black native	0.102	0.116	−0.024***	−0.044*	0.038	0.040
	(0.077)	(0.076)	(0.006)	(0.025)	(0.061)	(0.062)
Hispanic native	0.169**	0.103	0.162**	0.136*	0.019	−0.030
	(0.073)	(0.086)	(0.068)	(0.070)	(0.044)	(0.065)
Asian native	0.002	−0.037	−0.024***	0.008	0.003	−0.002
	(0.134)	(0.127)	(0.006)	(0.013)	(0.068)	(0.139)
Other native	0.359	0.262	−0.024***	−0.047	−0.062***	−0.145**
	(0.356)	(0.364)	(0.006)	(0.063)	(0.012)	(0.071)
White immigrant	0.279***	0.213**	0.036	0.001	0.185**	0.232**
	(0.091)	(0.105)	(0.042)	(0.046)	(0.082)	(0.093)
Black immigrant	0.193	0.077	−0.024***	−0.089	−0.062***	−0.096
	(0.275)	(0.242)	(0.006)	(0.069)	(0.012)	(0.086)
Hispanic immigrant	0.324***	0.225**	0.280***	0.275***	0.030	0.013
	(0.096)	(0.114)	(0.091)	(0.094)	(0.059)	(0.080)
Asian immigrant	0.405***	0.229*	0.034	0.079	0.439***	0.249**
	(0.108)	(0.121)	(0.042)	(0.048)	(0.117)	(0.120)
Other immigrant	−0.141***	−0.065	−0.024***	0.059	−0.062***	0.031
	(0.015)	(0.169)	(0.006)	(0.045)	(0.012)	(0.040)
Constant (white native)	0.141***	0.158***	0.024***	0.036***	0.062***	0.072***
	(0.015)	(0.018)	(0.006)	(0.009)	(0.012)	(0.014)
Observations	688	688	688	688	688	688
Adjusted R^2	0.07	0.10	0.09	0.21	0.07	0.05
MSA FE	No	Yes	No	Yes	No	Yes

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Robust standard errors are clustered at MSA level. The dependent variable is a dummy variable equal to 1 if the homeowner in 2011 was an immigrant of specified by column heading's ethnicity, and zero otherwise. The sample is restricted to identifiable MSAs. The FHFA HPI index is based on sales prices and appraisal data at MSA level.

tended to buy from Asian immigrants (columns (5) and (6)), but they also bought from white immigrants. All immigrants bought from native whites, but the proportion for Hispanics was significantly smaller (3.6 percent) than that for Asians (7.2 percent). We know no reason why undocumented immigrants should be more eager to buy from non-immigrants than are documented immigrants. The disappearance of undocumented immigrants from the market after 2007 should have been felt most strongly by immigrant homeowners.

Houses owned by immigrants lost more value in the bust than houses owned by non-immigrants. This is consistent with the undocumented immigrant hypothesis. We reach this conclusion with data from the AHS (see Table 7) and confirm it in the PSID sample (see Table A.18). In fact, holding MSA house price appreciation constant, Hispanic non-immigrants lost less in house value than white non-immigrants and non-immigrants generally, while Hispanic immigrants lost more in house value and at a significantly faster rate than white immigrants. These results remain unchanged with additional controls for house price appreciation, owner demographics, structure, and neighborhood characteristics. Immigration thus "explains" why Hispanic-owned houses lost so much value.

TABLE 7
HISPANIC IMMIGRANT HOUSES LOST MOST VALUE IN THE BUST, AHS 2007–11

	(1)	(2)	(3)	(4)
	b/se	b/se	b/se	b/se
White immigrant	−0.034	−0.037	−0.035	−0.006
	(0.056)	(0.053)	(0.050)	(0.048)
Black native	0.064**	0.034	0.035	0.021
	(0.030)	(0.032)	(0.031)	(0.029)
Black immigrant	−0.064	−0.072	−0.072	−0.012
	(0.142)	(0.137)	(0.127)	(0.103)
Hispanic native	0.052	0.034	0.055	0.076*
	(0.041)	(0.042)	(0.040)	(0.040)
Hispanic immigrant	−0.152**	−0.171***	−0.138**	−0.072*
	(0.059)	(0.057)	(0.056)	(0.039)
Asian native	0.072	0.063	0.087	0.081
	(0.116)	(0.120)	(0.126)	(0.110)
Asian immigrant	0.076	0.067	0.088	0.111*
	(0.062)	(0.062)	(0.060)	(0.059)
ΔHPI				1.293***
				(0.091)
Constant (white native)	−0.285***	−0.057	−0.260***	0.072
	(0.021)	(0.058)	(0.099)	(0.081)
Observations	6,242	6,242	6,242	6,242
Adjusted R^2	0.01	0.01	0.03	0.10
$X_{07,i}$	No	Yes	Yes	Yes
$Z_{07,i}$	No	No	Yes	Yes

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Robust standard errors are clustered at MSA level. The dependent variable is the change in house value between 2007 and 2011 for continuous homeowners. $X_{07,i}$ includes demographics for household head and household income data. $Z_{07,i}$ includes house and neighborhood characteristics. The sample is restricted to identifiable MSAs, and to homes that do not change tenure status. The FHFA HPI index is based on sales prices and appraisal data at MSA level.

We should be cautious about this result because the immigrants in the AHS in 2007 were different in many ways from the immigrants in the PSID in 2007 (most notably, the AHS included a much higher proportion of recent immigrants and almost certainly a much higher proportion of undocumented immigrants). Another qualitative difference between the PSID and the AHS is that in the PSID, we found a loss by black immigrant owners almost as large as the loss by Hispanic immigrant owners. But the sample of black immigrant owners in the PSID is very small (there are only eight black immigrants in this sample of continuous homeowners).

An alternative explanation for the disproportionately large house value loss of Hispanic immigrants is that they were unsophisticated and so made mistakes in home purchase and maintenance. If this were the case, they would have lagged natives in house price appreciation during the boom, too. But they did not. We re-ran our regressions on AHS data for the boom, and found no significant difference between Hispanic immigrants and either Hispanic or white natives (Table A.23). If anything, Hispanic immigrants did a little better than natives during the boom (although these differences were not statistically significant), which is what

would be expected if new techniques for undocumented immigrants to acquire mortgages were becoming known and routinized.

Finally, consider wealth. We have seen that losses in housing value were concentrated on Hispanic immigrants, as the undocumented immigrant hypothesis predicts. But did these disproportionate losses in housing value translate into disproportionate losses in wealth? Housing values are a component of wealth, but not wealth itself. They do not map into wealth without intermediating actions by households. In particular, households can offset changes in house values by saving or dis-saving. Recent work shows that changes in house values affect consumption; see Mian and Sufi (2016) for a summary of this literature. In results not included in the paper, we find that Hispanic homeowners offset the movement in house values less than other identity groups—they increased their non-housing wealth less in the boom, and reduced it less in the bust. Thus, relative to other identity groups, the cycle in wealth was larger relative to the cycle in house value for Hispanics.

Therefore, in Table 8, we look at wealth using PSID data, since AHS has no wealth information. The dependent variable is change in wealth position in the white 1999 wealth distribution for continuous homeowners living in MSAs between 2007 and 2011. When it comes to wealth, Hispanics lost more than whites as we have seen already, but the net wealth losses, unlike the net house value losses, are evenly spread between natives and immigrants.[19] Relative to natives, immigrants made up for more of their house value losses by decreasing debt and increasing non-housing wealth. Why? One possibility is intergenerational links. In the PSID especially, most native Hispanic households are the children of immigrants. Relative to members of other identity groups of the same age and income, these Hispanic native households had parents who suffered larger house wealth shocks in the Great Recession. Thus they could expect fewer transfers from their parents, and might be expected to make larger transfers to their parents. Both differences decrease the relative wealth of Hispanic natives. In this way, the reduction in demand by undocumented immigrants could have spilled over to Hispanic natives.

To summarize, we hypothesize that Hispanic continuous owners lost so much wealth in the Great Recession because undocumented immigrants (who were predominantly Hispanic) were treated worse in the Great Recession than other prospective homebuyers. Before this, undocumented immigrants were an important part of the demand for houses that Hispanics owned. This demand shock disproportionately reduced the value of Hispanic-owned houses, which in turn disproportionately reduced the wealth of Hispanic continuous owners. This hypothesis is in accord with the observation that "Mass illegality is a characteristic structural feature of Latin American immigration, setting Latinos apart from their Asian counterparts" Massey (2015, p. 4).

[19]There is an unexplained loss of wealth by black continuous owners in terms of percentage points, holding many characteristics constant, a proper exploration of which is beyond the scope of this paper.

TABLE 8
CHANGE IN WEALTH FOR CONTINUOUS HOMEOWNERS, PSID 2007–11

	(1)	(2)	(3)
	b/se	b/se	b/se
White immigrant	9.820***	7.367***	5.328
	(1.997)	(2.652)	(5.481)
Black native	−7.635**	−7.422**	−6.678**
	(3.274)	(3.118)	(2.655)
Black immigrant	−39.444***	−32.457***	−30.389***
	(2.139)	(2.076)	(2.233)
Hispanic native	−11.919**	−9.552**	−9.189**
	(4.718)	(4.411)	(4.534)
Hispanic immigrant	−10.328**	−6.477*	−7.295**
	(3.875)	(3.511)	(3.400)
Asian native	−0.844	−0.717	0.270
	(3.276)	(2.986)	(3.414)
Asian immigrant	6.478***	5.148*	2.647
	(2.010)	(2.719)	(2.701)
ΔHPI		0.251***	0.261***
		(0.038)	(0.038)
Constant (white native)	2.684	5.164**	5.733
	(2.524)	(2.385)	(7.341)
Observations	1,742	1,742	1,738
R^2	0.16	0.20	0.23
$X_{07,i}$	Yes	Yes	Yes
$X_{11,i}$	No	No	Yes

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors are corrected for multi-stage sample design. The dependent variable is the change in wealth position in the 1999 white wealth distribution for continuous homeowners living in MSAs between 2007 and 2011. The base group is white, non-immigrant, married, and working in the service industry. The FHFA HPI index is based on sales prices and appraisal data at MSA level.

Note, however, that there is little direct evidence on the housing market experiences of undocumented immigrants in the period we study. The AHS does not ask about immigration status. The PSID asked about immigration status only once at the initiation of the immigrant sample, in 1997. By design, of course, undocumented immigrants who arrived in the U.S. after 1997 and their children are almost entirely absent from the PSID. (Although SIPP has information on the legal status of immigrants starting with the 2004 interviews, this information is unavailable in the public use files.) Hence evidence for the undocumented immigrant hypothesis is indirect. Next, we consider some alternative hypotheses, and argue that the evidence does not support them.

6. ALTERNATIVE HYPOTHESES

We have already seen that several popular explanations for the large Hispanic wealth losses in the bust—loss of income, the collapse of construction, and so on—do not explain much (if anything). In this section, we will examine several other, more complex stories, and show that they, too, do not resolve the question.

6.1. *Neighborhood Effects*

Traditionally, housing sub-markets are defined by physically contiguous neighborhoods. House prices in these neighborhoods are expected to move together because they share the neighborhood's public goods, location, and amenities (including racial and ethnic composition); and because before the Internet, housing search efficiency used to require concentration on physically close locations.

Accordingly, some attempted explanations for the large fall in Hispanic house values appeal to neighborhood phenomena. Something about the neighborhoods in which they tend to live caused Hispanics' house values to fall more according to this class of explanations. What could make heavily Hispanic neighborhoods different? Most stories emphasize some aspect of segregation or discrimination, like thin resale markets or falls in value after Hispanic pioneers pay high prices to enter a neighborhood. Geographic concentration of subprime marketing efforts could also be a neighborhood effect story.

The undocumented immigrant hypothesis could also be interpreted as a neighborhood story, though it need not be. We could have said that the demand shock from closing the mortgage market to undocumented immigrants reduced house values in heavily Hispanic neighborhoods (because that was where undocumented immigrants were mainly searching for houses), and so Hispanics on average lost more value than other identity groups because they were heavily concentrated in these neighborhoods. But we did not make this argument, in part because the data suggested otherwise: Hispanic natives, who also tend to live in heavily Hispanic neighborhoods, did not lose house value disproportionately. Instead, we emphasized a social and informational view of sub-markets, instead of a physical one: undocumented immigrants tended to buy from other immigrants.

Still, the social is not totally untethered from the physical. For many reasons, undocumented immigrants were probably more likely to buy homes in heavily Hispanic neighborhoods than in other neighborhoods. So the undocumented immigrant hypothesis implies that we should see some neighborhood effects, but not necessarily strong ones.

To look for neighborhood effects, we interact owner identity group with type of neighborhood. (Type of neighborhood by itself without interactions is likely to be collinear with owner identity group.) We use census tracts in the 2000 census to represent neighborhoods. Because our sample of Hispanic continuous owners is small, we divide tracts into three bins. First, we array tracts by the proportion of the population that was Hispanic in the 2010 census. We start with the most heavily Hispanic tract represented in the PSID,[20] and we place tracts into the bin called "heavily Hispanic" until the tract codes in that bin contain half of the Hispanic continuous owners in our sample. Then we do the same for blacks and create a bin called "heavily black"; the tract codes in this bin contain half of the black continuous owners in the PSID. There turns out to be very little overlap between these two bins. The remaining tract codes, neither "heavily Hispanic"

[20]The AHS would provide a better ground to test the neighborhood hypothesis, but unfortunately we do not have geographic details beyond MSA identifiers in the publicly available dataset.

nor "heavily black" are in the third bin, which we label "everything else". Then we regress log house price change on identity group variables and interactions between identity group variables and bin variables. We use standard controls including MSA house price appreciation. The coefficients on the interaction variables are an estimate of neighborhood effects, and the coefficients on the identity group variables are estimates of identity group effects separate from neighborhood effects. The results are shown in Table A.20.

We find that there is a strong negative black neighborhood effect, but that the Hispanic neighborhood effect, although also negative, is significantly smaller and statistically insignificant. (Of course, even the neighborhood effects that we estimate here are not strictly causal, since they could reflect sorting into neighborhoods.) Hispanics lost more than their white neighbors, both inside and outside Hispanic neighborhoods, but the difference outside heavily Hispanic neighborhoods is again not statistically significant. Neighborhoods seem to have some power in explaining why black houses lost so much value, but little power to explain why Hispanic houses lost so much.

6.2. *Timing of Purchases*

One possible story—suggested by Wolff (2014)—is that Hispanics timed their purchases of houses poorly. Consider a bubble. As the bubble inflates, prices rise. Those who buy the asset at a low price early in the bubble accumulate considerable capital gains before the bubble bursts, while those who buy late have limited capital gains before the bubble bursts. So early purchasers net more from the bubble than late purchasers. If Hispanics were concentrated among late purchasers, they would have lost disproportionately more from the cycle.

This story has at least two difficulties. The first is that Hispanics were not heavily concentrated among late purchasers. Hispanics in the PSID purchased houses roughly at the same time as others. In 2007, the median year of purchase for a house owned by an Hispanic household was 1998, and that for the entire sample was 1997. If we confine attention to houses bought between 1999 and 2007, the median year of purchase for Hispanics was 2003, the same as for the entire sample. Hispanics in our PSID sample did not come "late to the party"; they came at about the same time as everyone else.

The other difficulty with the late-to-the-party story is that even if it were true, it would not explain what we are trying to explain—why Hispanic wealth fell more than wealth for other identity groups after 2007. A standard model of a bubble implies that wealth for all holders of the asset falls at the same rate. So the late-to-the-party story would imply differential wealth appreciation before 2007 (which we did not find) and identical wealth depreciation after 2007 (which we did not find either).

To test this hypothesis, we regress wealth change between 2007 and 2011 on the usual variables, the year of original mortgage contract (our proxy for house purchase date), and whether there is a mortgage on the house, as of 2007 (see Table A.21). As expected, adding the year of house purchase to the basic equation makes little difference to the coefficient on Hispanic dummy. We do find that later purchasers lost more than earlier purchasers and that those without a mortgage

lost less. Controlling for whether the original mortgage was later refinanced barely changes this result. In other results not shown, we do find that Hispanics who purchased late lost more than other groups, but these group differences are small. More importantly, controlling for the year of purchase does not remove our finding that Hispanic and black continuous homeowners lost more wealth than whites or Asians.

In addition, we find that the composition of financial portfolios, differentials in household expenditures, and neighborhood effects taken together are not enough to explain the differential loss in wealth experienced by Hispanics relative to whites (see Table A.21). If anything, the differential actually rises once all the potential explanations are added together into one model: Hispanic wealth falls by an additional statistically and economically significant 14 percentage points.

6.3. *Leverage and Housing Wealth*

Another possible explanation for the dramatic decline in Hispanic wealth during the bust is different levels of leverage (Wolff, 2014). If Hispanic homeowners were more heavily leveraged than other groups, then they would have suffered a greater wealth contraction for any given decline in home values in their areas of residence.

Along similar lines, the share of housing in net wealth varies considerably across groups, no matter how this share is defined and measured. For instance, if one looks at the household with median wealth (among homeowners only) the share of housing in total wealth was 51 percent for whites, 60 percent for Hispanics, and 70 percent for blacks in 1999. So among homeowners, Hispanics and blacks were most vulnerable to price movements in the real estate market. In principle, this could have been responsible for the large collapse in Hispanic wealth.

To test for this, we carried out a simple thought experiment. Using only those households present in both 2007 and 2011, we constructed a hypothetical 2011 wealth level by simply taking their 2007 wealth and reducing the value of their homes by the average decline in home values in their 2007 state of residence. This was then used as their imputed wealth in 2011. The imputed measure answers the following question: what would the household's wealth in 2011 have been if the only change on their balance sheet was a fall in their home value equal to the average fall in their state of residence?

Clearly, actual and imputed wealth would be identical for those who were renters in 2007. For owners, the imputed value takes account of their leverage and the share of housing in total wealth, so the actual and imputed distributions should be close. If they are not, then something other than these factors must be the reason. We computed actual and imputed wealth distributions for the four groups, and Table 9 lists the wealth indexes (as defined in Section 2) for both actual and imputed distributions by group. The two distributions are virtually identical for whites, suggesting that the fall in home values alone can account for the actual changes in wealth during the bust. The two distributions are also very close for Asians, and somewhat less so for blacks. But for Hispanics they are far apart: the actual wealth decline was much greater than can be accounted for by a decline in average home values in the state of residence, given household leverage

TABLE 9
THE ACTUAL AND IMPUTED WEALTH INDEXES IN 2011, PSID

	White	Black	Hispanic	Asian
Actual	109	53	52	127
Imputed	110	59	70	126

levels prevailing in 2007. Something other than differential leverage levels and the share of housing in total wealth must have played a significant role.

7. CONCLUSION

Our goal in this paper has been to document and attempt to explain the striking amplitude in Hispanic wealth fluctuations (relative to those of other groups) during the first decade of this century. We have argued that household characteristics and location can adequately account for the boom but not the bust. Across groups, we found large differences in the experiences of those who remained homeowners throughout the period of housing market decline. Those owners who lost or sold their homes had severe contractions in wealth, but these losses were not markedly different across groups. Among continuous homeowners, Hispanic immigrants were hardest hit.

This led us to the undocumented immigrant hypothesis, since immigrant owners were the natural counterparties for undocumented buyers. Demand from such buyers was robust during the boom, but was suddenly and almost completely choked off with the collapse of private label securitization. Whether this event had broader housing market implications—beyond the effect on a particular ethnic group—is an interesting question that deserves further exploration.

It is also important to look at the experiences of households that were not in the PSID, in particular post-1999 immigrant households and the households that evolved from these. It is a challenge to do this because of both data problems (the PSID does not include these households and we know of no other longitudinal study that follows them over the entire time period considered in this study) and conceptual problems (many of these households will be in the U.S. for less than the entire period). Nevertheless, these households are well worth studying.

In addition, more work needs to be done to study how the boom and bust affected African Americans and Asians. Because the Hispanic trajectory was more spectacular, we concentrated on it in this paper, but these identity groups should be studied on their own. It is interesting to observe that in the boom, the dichotomy seemed to be between "newcomers" (Hispanics and Asians) and "old-timers" (whites and blacks), while in the bust the dichotomy reverted to the more traditional distinction between disadvantaged minorities and others. The identity groups that lost the most wealth in the bust were those that included large numbers of adults with less than full legal membership in American society—undocumented immigrants, prisoners, ex-prisoners, and probationers. Whether there is a causal connection there remains to be investigated.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

Appendix

A.1 Reference Wealth Distribution and Summary Statistics, PSID
Table A.1: Reference Wealth Distribution: Non-Hispanic White, PSID 1999
Table A.2: Wealth Distribution by Identity Group (Medians), PSID 1999–2011
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